State of the Art Procedures for Assessment and Treatment of Learners With Behavioral Problems

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Abstract

Challenging behavior can create significant obstacles to academic and social progress for individuals in a school setting, particularly those with developmental disabilities. Functional assessments such as rating scales, ABC analyses, and functional analyses, are evidenced to be the most effective methods for identifying the maintaining variables of problem behavior and for informing efficient, function-based interventions. Although the empirical literature and federal mandates support the use of functional assessment, obstacles to the practical application of these procedures in school settings (e.g., training requirements, time constraints) may deter school staff from using them consistently. Recent research has addressed some of these concerns, and there is developing evidence for briefer, more user-friendly versions of functional assessment. Practitioners can maximize the effectiveness of the intervention process by linking treatment components to functional assessment results. Effective, function-based interventions are comprised of procedures designed to reduce target behavior prior to it occurrence, procedures to teach the learner to access the reinforcer (or an adaptive alternative) appropriately, and systematic procedures for responding to the behavior. Future studies should continue to refine these procedures and address the use of functional assessment with extended populations, including adults with disabilities and typically developing children.
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Addressing problem behavior in school settings poses a significant challenge to classroom teachers, school administrators, and consultants. The passage of the 1997 Individuals with Disabilities Education Act (IDEA) amendments have increased the pressure felt by school districts to use sound assessment procedures. One procedure commonly used to reconcile federal mandates with well-evidenced practice is the functional behavioral assessment (FBA). Functional assessment techniques have been shown to be effective for determining the underlying cause, or function, of challenging behavior (e.g. Hanley, Iwata, & McCord, 2003). From this causal information, practitioners are able to match interventions to the function of the behavior, thereby increasing the effectiveness and the efficiency of the intervention. Despite the established efficacy of FBA, there exists a gap between evidence and practice; some have questioned the applicability of this set of procedures in the general school system (Scott, Bucalos, Nelson, Liaupsin, Jolivette, & Deshea, 2004). In fact, although this literature is large, the focus of the literature rarely extends beyond developmentally disabled young learners. As a result, the literature has clearly documented what represents state-of-the-art assessment and intervention with a specific population (young, developmentally delayed individuals), while comparatively less research has documented what represents state-of-the-art in other populations (older learners, typically developing learners).

The purposes of the present manuscript are to identify what represents best practice for assessment and intervention, to identify areas in need of future research, and to propose suggestions for future research/system-wide interventions.

An Overview of Functional Assessment

FBAs comprise a series of instruments for gathering information on problem behavior that can be used to maximize the efficiency of behavioral support (O'Neill, Horner, Albin, Storey, & Sprague, 1997). Specifically, an FBA thoroughly examines the maintaining factors (i.e., antecedents and consequences) of well-defined problem behavior. Rigorous analyses have yielded significant evidence for four maintaining

mechanisms of challenging behavior: attention (i.e., access to positive attention or reprimands), tangible (i.e., access to preferred items or activities), negative reinforcement (i.e., escape from an aversive task or sensation), and automatic reinforcement (i.e., the consequences of the behavior are intrinsically reinforcing).

Over the past decade FBA has been employed frequently by school psychologists and behavior analysts in school settings. The widespread use of these procedures is based upon hundreds of efficacy and effectiveness studies. The literature strongly suggests a viable link between an in-depth assessment of the functions of behavior and effective treatment planning. FBA particularly suits itself to this task by streamlining the assessment process. In narrowing down the number of potential interventions, treatment planners are better equipped to create function-based interventions to decrease problem behavior. Professional organizations, such as the Association for Behavior Analysis (ABA) and the National Institute of Health (NIH), have strongly endorsed the use of FBA in clinical practice. In 1997, the IDEA legally mandated that FBA be included in the process of creating behavior intervention plans to address challenging behavior (Drasgow & Yell, 1997). However, a lack of clearly specified legal guidelines to stipulate a good definition of FBA and an applied hierarchy of its procedures has contributed to its inconsistent use in applied settings. Additionally, some professionals have argued that the applicability of FBA is limited, citing the need for extensive training and expertise (Sasso, Conroy, Peck-Sticher, & Fox, 2001; Scott et al., 2004). Considering all these factors, it is not surprising that FBAs are often implemented in an inconsistent, or sometimes, inappropriate manner. For example, school professionals who are not adequately trained in FBA may default to the most cost-effective assessment procedures, such as interviews and rating scales. Reliance on these methods may provide less accurate information, and resulting intervention plans may not adequately address the function of behavior. The following review of the hierarchy of FBA procedures will attempt to clarify some of these issues.

Indirect/Informant Methods of Functional Assessment

Indirect assessment includes interviews and rating scales. These procedures comprise the preliminary steps of problem solving in functional assessment. While these methods alone do not adequately address the functions of problem behavior, they provide necessary information for subsequent functional assessment procedures.

Clinical interviews with caregivers and teachers are generally used to gather detailed information regarding the nature of the target behavior. It is best to interview as many individuals as possible who have direct contact with the student and who are familiar with his/her behavior. By including individuals across common settings it is also more likely that the resulting intervention will be effective in many contexts. Examples of frequently used rating scales and structured interviews include the Setting Event Checklist (Gardner, Cole, Davidson, & Karan, 1986), the Motivator Assessment Scale (MAS; Durand & Crimmins, 1992), and the Functional Analysis Interview (FAI; O'Neill et al., 1997).
The purpose of an interview is to gather several critical pieces of information. First, an *operational definition* should be generated, in which the target behavior is described in ample detail. The hallmark of a sufficient operational definition is that any person involved with the student can reliably identify an occurrence of the behavior. Second, operational definitions should also be created for the events that precede the behavior (antecedents) and those that follow behavior (consequences). For example, problem behavior may frequently follow the presentation of an aversive task (antecedent) and result in access to a break from that task (consequence). As in this example, the relationship between antecedents, behavior, and consequences should be established through systematic interview. Lastly, information regarding the level of interference and prevalence of the behavior should be gathered. This information may advise whether a formal intervention is time and cost-effective.

The main benefit to indirect assessment is that it is a quick way to gather information that will be used to guide higher-order functional assessment procedures. Disadvantages arise when indirect methods are used

as a standalone measure. The information obtained from these assessments may not be reliable, as it is not based upon direct observation or manipulation of the behavior. Furthermore, subjective impressions can interfere with the way in which staff members report on behaviors, leading them to provide information that supports their impressions. Nevertheless, information obtained via indirect assessment can have utility. When used properly, interviews and rating scales represent a useful preliminary step in the assessment process.

Descriptive Assessment

Descriptive assessment involves gathering detailed information on behavior observed in the natural environment. In one such method, informal direct observation, the observer uses information gathered from structured interviews to define a target behavior or set of behaviors. Data on the prevalence of the behavior are then collected *in vivo*. Another method, antecedent-behavior-consequence (ABC) analysis, involves the direct observation of the target behavior as well as the events that precede and follow it. In ABC analysis, every observation of the behavior is accompanied by an operationally defined antecedent and consequence. These data are then analyzed using conditional probabilities (i.e., the percentage of antecedents and consequences associated with the behavior are calculated as a function of the total behavior frequency). Patterns emerge through graphing these probabilities, provided a sufficient amount of data has been collected.

In contrast to indirect assessment, descriptive assessment is based upon actual observations of the behavior in the natural environment, so it generally provides information that is more accurate and socially valid. Observational data are also more objective and less susceptible to bias. However, descriptive assessment is limited in that it involves no experimental manipulations of the events surrounding problem behavior. The observed relationships are correlational, and a functional determination for problem behavior cannot be sufficiently demonstrated. Furthermore, there can be variability in the skill levels of persons completing the ABC forms, leading to incomplete or subjective descriptions of antecedents and consequences.

Analogue Functional Analysis

The most sophisticated procedure in the functional assessment hierarchy is functional analysis. *Functional analysis* is often incorrectly equated with *functional assessment*; for the purposes of this paper, functional analysis will refer to a specific set of procedures designed to systematically manipulate the antecedents and consequences surrounding problem behavior. Functional analysis is the most rigorous approach to defining the factors maintaining problem behavior because it is based upon the use of environmental manipulations and the use of experimental designs to evaluate the function of behavior. The conceptual basis for functional analysis was proposed in a paper by Carr (1977), in which he suggested that problem behavior might be influenced by environmental factors. Models for clinical practice were later developed and refined (Carr & Durand, 1985; Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994). The efficacy of functional analysis has been widely documented in the research literature (Hanley et al., 2003).

As mentioned above, functional analysis procedures stipulate that environmental stimuli are systematically manipulated to evoke problem behavior. A specific series of test conditions are designed to be representative of contingencies in the natural environment that may trigger and maintain the target behavior. Empirical evidence supports the use of five general test conditions: social attention, tangible/restricted access, escape/demand, alone/ignore, and toy play. Descriptions of each condition are provided below.

The first two conditions test to determine if problem behavior is maintained by positive reinforcement. In the social attention and tangible conditions, the stimuli are initially presented to establish a motivating operation for either attention or preferred items. This increases the likelihood of the individual engaging in problem behavior when the stimuli are withheld.

In the *social attention* condition, attention is provided noncontingently and then withheld. Further attention is provided contingently upon the occurrence of problem behavior (e.g., "Don't hit your head!"). If the individual engages in high rates of the behavior in this condition, social attention is implicated as a viable reinforcer.

In the *tangible/restricted access* condition preferred items or activities are provided to the individual, withheld, and then represented contingent upon the target behavior. High rates of behavior in this condition indicate that problem behavior is maintained by access to tangible items.

The *escape/demand* condition is based upon the negative reinforcement paradigm; it determines if problem behavior is maintained by escape from an aversive stimulus. In this condition the individual is presented with a non-preferred stimulus (e.g., difficult task), and the task is removed for 20-30 seconds contingent upon problem behavior. High rates of problem behavior in this condition suggest that escape from demands functions as reinforcement for the target behavior.

The *alone/ignore* condition is designed to evaluate the automatically reinforcing nature of the target behavior. This condition does not include programmed antecedents or consequences for target behavior. Traditionally, this condition runs with the individual placed in an empty room (i.e., alone). If there are concerns that the behavior is dangerous and may require an intervention, the condition may be run where the examiner is present but does not interact with the learner (i.e., ignore). If the individual engages in high rates of behavior in this condition it is likely that the behavior is reinforced by the natural consequences that the behavior itself produces (e.g., sensory stimulation).

A *toy play/control* condition is the control to which all other conditions are compared. The individual is placed in an "enriched environment" in which he has access to preferred items, noncontingent attention, and an absence of demands/aversives. In this condition the examiner does not modify his behavior contingent upon the target behavior. If there is a clear external maintaining mechanism of problem behavior (i.e., attention, tangible, or escape) to problem behavior low rates are expected in this condition. High rates of problem behavior in the control condition lend support to an automatic function.

The functional analysis is advantageous in its sensitivity to the potential maintaining factors of problem behavior and its systematic approach to this evaluation. It is also the most efficacious assessment procedure documented in the literature (Hanley et al., 2003). However, certain limitations to the functional analysis may undermine its effectiveness, especially in school settings. Firstly, the procedures may be time-prohibitive. Several hours of analysis may be needed to ascertain a clear function for behavior, and this may be restrictive in many educational settings. Fortunately, modifications to functional analysis procedures may effectively alleviate these concerns. For example session lengths may be reduced to five without sacrificing the accuracy of the analysis (Northup Wacker, Sasso, Steege, Cigrand, Cook, & DeRaad, 1991; Wallace & Iwata, 1999). Another strategy is to present fewer overall conditions (Northup et al., 1991). A specific hypothesis for the function of problem behavior may be derived using information obtained from interviews and direct assessment. Conditions based upon the suspected function may be alternated with the control condition in a pairwise or hypothesis-driven functional analysis. Secondly, effective functional analyses require staff with a certain level of expertise in its procedures. Although this poses a slight challenge in school settings, research indicates that the required skills can be effectively disseminated (Iwata, Wallace, Kahng, Lindberg, Roscoe, Conners, Hanley, Thompson, & Worsdell, 2000; Moore, Edwards, Sterling-Turner, Riley, DuBard & McGeorge, 2002).

State of the Art Practices: Intervention Development

After conducting a functional assessment, interventions are typically generated based on the results. Developing interventions based on the function of the behavior allows practitioners to be more efficient in the intervention process. A considerable amount of research has shown that behavioral interventions based on the function of behavior are consistently more effective than interventions that are based on topography (Carr & Durand, 1985; Paclawskyj, Kurtz, & Connor, 2004).

There are three broad categories of function-based intervention strategies, which include, a) strategies for preventing challenging behavior, or antecedent interventions, b) providing alternative strategies to access the reinforcer (or an adaptive alternative) using appropriate behavior, and c) planned strategies for reacting to the occurrence of maladaptive behavior (extinction or punishment).

Prevention/Antecedent Strategies: Antecedent strategies generally involve taking measures to prevent the target behavior from occurring. Commonly used antecedent strategies include the use of school-wide behavioral intervention, general classroom management, fading procedures, and noncontingent reinforcement.

There has been a substantial amount of literature supporting the use of school-wide interventions to prevent challenging behavior (Horner & Sugai, 2000; George, White, & Schlaffer, 2007; Lewis, Sugai, & Colvin, 1998; Sugai & Horner, 2002). School-wide models generally have three levels of intervention: primary (universal), secondary (selected/targeted) and tertiary. Primary intervention typically includes three to five positively stated school rules that are directly taught and reinforced with all students within a school setting. Primary interventions are often called "universal" interventions because they are applied across all students within the school environment (Walker, Horner, Sugai, Bullis, Sprague, Bricker, & Kaufman, 1996). Secondary intervention involves targeting students who display risk factors that require more specialized forms of support. Secondary intervention may include social skills training, tutoring and mentoring programs. Tertiary interventions target populations with persistent behavioral problems that have not responded to primary or secondary interventions. Learners in need of tertiary intervention require individualized intensive intervention to address challenging behavior.

Another type of antecedent intervention involves the effective use of classroom management procedures. These types of intervention may include making environmental and/or instructional adaptations to prevent challenging behavior from occurring. Environmental adaptations may include decreasing distractions or changing a student's seating location (e.g., seated closer to the teacher). Instructional adaptations may include changing the way demands are presented (e.g., providing frequent breaks during tasks), providing clear expectations across settings, and ensuring that instructional materials or tasks presented are at an instructional level for the learner (e.g., with necessary prerequisite skills).
Fading procedures represent another commonly used intervention component. Practitioners can use functional assessment procedures to identify aversive stimuli in the environment and use fading procedures to improve tolerance of these stimuli. For instance, if the presentation of a full math worksheet is aversive to a learner, practitioners may start by delivering math problems in smaller increments (4 to 5 problems at a time) and gradually increase the response requirement (e.g., 10 or 20 problems at a time). Such fading procedures have been used successfully with a variety of populations, including increasing food/liquid acceptance in learners with pediatric feeding disorders (Mueller, Piazza, Patel, Kelley, & Pruett, 2004; Patel, Piazza, Kelly, Ochsner, & Santana, 2001), treating phobias (Shabani & Fisher, 2007), sensitivity to noise (McCord, Iwata, Galensky, Ellingson, & Thomson. 2001) and to introduce academic tasks (Pace, Iwata, Cowdery, Adree, & McIntyre, 1993). Similarly, learners can also be taught to delay access to tangible items or attention by providing reinforcement for waiting increasing amounts of time. Researchers have used fading procedures to teach learners to delay access to edible reinforcement (Neef, Bicard, & Endo, 2001) and delayed access to social attention (Fyffe, Kahng, Fittro, & Russell, 2004).

Another commonly used antecedent intervention is noncontingent reinforcement. Noncontingent reinforcement involves the delivery of a reinforcer (usually the reinforcer identified in the functional

assessment) on a fixed time schedule (Vollmer, Iwata, Zarcone, Smith, & Mazaleski, 1993), rather than contingent upon the learner's behavior. For instance, if an assessment identified escape from demands as a reinforcer for challenging behavior, practitioners may provide breaks on a time-based schedule (rather than contingent upon maladaptive behavior). Similarly, if a learner engages in disruptive behavior to access adult attention, practitioners may be able to deliver social attention on a time-based schedule to decrease the occurrence of the target behavior. The empirical literature has shown that noncontingent reinforcement can be very effective for reducing the occurrence of challenging behavior. There are two possible mechanisms through which noncontingent reinforcement exerts its effects. One reason for its effectiveness is that the relationship between the maladaptive behavior and reinforcement is disrupted. In other words, the reinforcer is being delivered independent of the behavior (and the target behavior is contacting extinction), which may make the target behavior irrelevant. Another possible reason is that by delivering the reinforcer on a schedule, it alters the motivation to engage in maladaptive behavior (Lalli, Casey, & Kates, 1997).

Replacement Skills/Functional Communication Training: Functional communication training (FCT) involves the identification of the function of challenging behavior and teaching an adaptive request to access the identified reinforcer (or an adaptive alternative) appropriately. Carr and Durand (1985) were the first to identify the importance of teaching replacement skills and how the important it was for practitioners to link the function of challenging behavior to the intervention process. First, the authors found that that challenging behavior decreased when a functional mand/request was taught. In addition, they found that challenging behavior did not decrease when a non-functional mand/request was taught. Many studies have since replicated these findings and shown the effectiveness of functional communication training to decrease a variety challenging behaviors (Fisher, Piazza, Cataldo, Harrell, Jefferson, & Conner, 1993; Hanley, Iwata, & Thompson, 2001; Kelley, Lerman, & Van Camp, 2002; Wacker, Steege, Northup, Sasso, Berg, Reimers, Cooper, Cigrand & Donn, 1990; Worsdell, Iwata, Hanley, Thompson, & Kahng, 2000).

The general procedure for FCT involves identifying the function of challenging behavior and teaching a request to access that reinforcer. For instance, if a learner engages in disruptive behavior to access attention, they could be taught to request attention appropriately (e.g., by raising their hand, exchanging a communication card, saying "Talk to me please"). Similarly, a learner who engages in escape maintained behavior can be taught to request breaks or help (e.g., signing "help", saying "Can I have a break?"). The topography of the response taught should be based on the communication repertoire of the learner and the likelihood of reinforcement for that response in the learner's environment.

Reactive Measures/Consequences for Challenging Behavior: In general, three events can occur contingent upon challenging behavior: it can be reinforced (producing an increase in the behavior), it can be punished (producing a decrease in the behavior), or, it can contact no differential consequence (producing a decrease in the behavior). Given that the goal for practitioners is to decrease the occurrence of challenging behavior, extinction and punishment are commonly used intervention components.
Extinction occurs when reinforcement of a previously reinforced behavior is discontinued (Cooper, Heron, & Heward, 2007). Extinction involves the disruption of the relationship between the target behavior and reinforcement (Lerman & Iwata, 1996). For instance, if a learner engaged in disruptive behavior to access attention and attention was no longer delivered, disruptive behavior would subsequently decrease (or shift to another topography of disruptive behavior to access attention). To effectively use extinction, practitioners must know the function of challenging behavior because extinction is implemented differently depending on the maintaining factors (Iwata, Pace, Cowdery, & Miltenberger, 1994). For instance, when extinction is implemented for positively- reinforced behavior, a reinforcer is withheld contingent upon the occurrence of a target behavior (e.g., access to tangibles or attention is not delivered contingent upon maladaptive behavior). Negatively reinforced behavior is extinguished by not removing a stimulus contingent upon disruptive behavior (e.g., not removing a demand contingent upon aggression). Automatically reinforced behavior (which may be either positively or negatively reinforced) would be extinguished by blocking the sensory input obtained by engaging in the behavior (e.g., sensory blocking, response blocking).

Extinction is most effectively used as a component in an intervention, rather than as a stand-alone procedure. Unless the motivation for engaging in maladaptive behavior is addressed, it is likely that the topography of the behavior will change, but the overall rate of challenging behavior will persist. For instance, if a learner engages in maladaptive behavior (e.g., mild disruption) to access attention and caregivers do not attend to the behavior, the learner may shift to another, potentially more severe topography of behavior (e.g., aggression) unless another component is added (e.g., teaching the learner to access attention appropriately, providing attention on a fixed time schedule independent of the target behavior). In addition, it is important to note that extinction is generally not appropriate for immediately harmful behavior (e.g., severe aggression or self-injury).

Punishment involves either the contingent removal (negative punishment) or presentation (positive punishment) of a stimulus that *decreases* the future likelihood of a behavior. Negative punishment procedures include such procedures as time-out (removal from access to earn reinforcement) and response cost (removal of reinforcers). Positive punishment procedures include reprimands, overcorrection, and aversive stimulation. It is important to note that punishment is defined by its effect on behavior. It may be the case that punishment procedures are used inappropriately and do not have the intended effect on challenging behavior. The appropriate use of punishment requires knowledge of the function of behavior. For instance, providing reprimands for attention-maintained challenging behavior may actually increase the rate of the target behavior. Similarly, placing a learner in time-out contingent upon escape-maintained disruptive behavior may increase the rate of disruptive behavior as well. Although the use of punishment is often a controversial topuc, the appropriate use of punishment can be beneficial to learners. A recent review by Lerman and Vorndran (2002) outlined best practices in the use of punishment procedures and other studies have shown how proper use of punishment can greatly enhance the effectiveness of interventions (e.g., Hagopian, Fisher, Sullivan, Acquisto, & LeBlanc, 1998).

Functional Assessment and Intervention: Areas in Need of Research

Typically Developing Children: Although the assessment and intervention literature has clearly outlined a variety of empirically supported procedures, there are still many areas in need of research. Perhaps the most glaring area in need of research is the use of functional assessment with typically developing learners. Given the frequency of challenging behaviors exhibited by typically developing learners and the disruption that such behaviors cause in educational settings, the need to extend this line of research to typically developing learners is compelling. According to a review of the literature, only 9% of the functional analysis research through 2000 had been conducted on typically developing learners (Hanley et al., 2003). One possible reason for this discrepancy is that traditional models of functional analysis may be too artificial for practical use in typically developing learners (e.g., they may ask why the therapist is removing instructional items in a demand condition). The structured antecedent and consequence conditions may also be too contrived to derive valid results.

Another reason for this gap in the research is that functional analyses tend to target immediate antecedents and consequences. In populations with developmental disabilities, behavior may be governed by these immediate contingencies, which may result in comparatively more valid assessment results. The behavior of typically developing learners tends to be more complex. For typically developing learners, the antecedents that trigger challenging may occur hours, weeks or days in advance and the reinforcers for the behavior may be obtained well after the behavior has occurred. These complex relations between antecedents, the behavior and the consequences may limit the usefulness of traditional procedures in this population and may call for the development of assessment strategies that are better able to identify more remote antecedent conditions.

Another limiting factor is that maladaptive behavior in typically developing populations is often not readily observable. Covert behavior may include topographies such as bullying, self-cutting/mutilation, or illicit drug use. These behaviors may not be exhibited in readily observable settings, making assessment difficult.

Possible solutions for assessing the behavior of typically developing students may involve alternative functional analysis procedures. For instance, AB models of functional analysis have received empirical support and may be more naturalistic for use with typically developing learners. Also referred to as structured descriptive assessments, AB models involve manipulating the antecedents to challenging behavior (e.g., presentation of demands, no attention) and observing the effects on the occurrence of target behavior in the natural environment. These general procedures have been shown to be effective for evaluating the causes of challenging behavior (Anderson & Long, 2002; Freeman, Anderson, & Scotti, 2000). In addition, some recent research has suggested that these procedures are useful in typically developing populations (Anderson, English, & Hedrick, 2006).

Given the limitations of the more intrusive models of functional assessment in typically developing learners, practitioners often use indirect models of functional assessment, such as interviews and behavioral rating scales. Although some literature has been published comparing indirect measures with other measures (e.g., Sturmey, 1994), relatively little research has compared indirect measures with direct models of functional assessment. The general consensus is that these measures are not as accurate as more in-depth methods of assessment (i.e., descriptive assessment, functional analysis), and more research needs to be conducted to evaluate the relative accuracy of these indirect measures. Such research could be used to determine which questions or components of an interview/rating scale are the most important to ask and, therefore, lead to the development of more valid and reliable indirect measures.

Adults with Disabilities: Another area in need of future research involves the development of models of functional assessment for older learners. Comparatively speaking, most functional assessment research has focused on younger populations (Hanley et al., 2003). The principles that govern behavioral change apply across all populations and functioning levels; however, research has not addressed the implementation issues unique to adult populations with the same rigor that has been applied to younger age groups.

There are a number of factors that influence the use of functional assessment procedures in older populations. For instance, many people often avoid working with adults who exhibit challenging behavior for fear of injury (Hastings & Brown, 2000). Adults with autism or other developmental disabilities may engage in maladaptive behavior that is considerably more intense or severe as compared to younger children. These fears may understandably make staff less likely to use assessment procedures that increase the likelihood that challenging behavior occurs, even though such environmental manipulations have the most empirical support. Another issue that affects the use of functional assessments in adults is that fact intervention is often more labor-intensive for this population. Reasons for this may include a longer history of engaging in the behavior (Matson, 1988), multiple functions for the behavior (Rojahn & Schroeder, 1991), or multiple topographies of behavior to intervene with (Borthwick-Duffy, 1994). The difficulty and/or complexity of the intervention may make families and staff less likely to use empirically validated assessment instruments.

These factors have resulted in a relative dearth of functional assessment research in adult populations. The lack of research in adults is particularly problematic given that it clearly compromises the quality of life for the learners and their families. This is especially critical given that effective intervention is directly related to the level of restrictiveness of placement. Research has shown that the inability to control maladaptive behavior leads to more restrictive placements for older learners with developmental disabilities (Joyce, Ditchfield, & Harris, 2001). Not only are these settings more restrictive, but they are also considerably more expensive. Related to this point, the inability to effectively intervene with maladaptive behavior limits employment and community opportunities for adults with autism. These issues (restrictiveness, cost, lack of

community integration) lead to considerable family stress and have practical implications for the social development of these learners.

Practical Implementation Issues: Perhaps one of the most significant concerns about empirically supported models of functional analysis is that they are not consistently used in applied settings. The time required to conduct a functional assessment make their use prohibitive in applied settings, particularly schools. To address this, brief models of functional analysis have emerged. Models for outpatient clinics (e.g., Northup et al., 1991) and other brief variations of functional analysis procedures (Sigafoos & Saggers, 1995) have produced encouraging results.

Another limitation to the use of sound functional assessments in applied settings is the level of expertise required to implement the procedures. Many teachers are not equipped to conduct well-designed functional assessment in the classroom. Functional assessment is often only given cursory consideration in many training programs. They therefore require guidance regarding the use of FBA and education regarding the benefits of conducting such analyses. However, providing adequate training and support to a large profession is a significant challenge. One way to approach this problem is through more effective dissemination. A pyramidal training structure may offer a cost-effective model for training the large groups of professionals currently in the school system (Iwata et al., 2001; Moore et al., 2002, Wallace, Doney, Mintz-Resudek, & Tarbox, 2004). Another tactic is to focus research efforts on more "user-friendly" models of functional assessment. This objective strives to combat resistance to using the more complicated and time-consuming procedures described in this paper. However, until these procedures become a part of teacher training curricula, their widespread use will be limited.

Another area in which traditional models of assessment may be lacking is in its use for infrequent or intermittent challenging behavior. For instance, some learners may have behavioral outbursts that occur at a relatively low rate (e.g. once a week or less), yet may still require intervention due to its intensity (e.g., severe aggression or property destruction). Such infrequent behavior can be difficult to assess given the limited opportunities to observe the behavior. Similar to what was described above, empirically validated indirect measures may need to be developed to address the needs of these cases. Another option may be to conduct more structured analyses of *precursors* to the main target behavior (Smith & Churchill, 2002). It may be possible to identify other behaviors in the same response class that reliably precede more severe topographies of maladaptive behavior. For instance, descriptive data may indicate that a more frequent, less severe topography of behavior (e.g., cursing) reliably precedes a more severe topography of behavior (e.g., aggression), and it is possible to conduct the analysis for that less severe topography.

Another area in need of research is in the effective use of functional communication training. While functional communication has clearly been shown to be an effective intervention for challenging behavior, there may be circumstances in which the "replacement" of challenging behavior may not be warranted. For instance, a functional assessment may indicate that challenging behavior is maintained by escape from demands. A function-based intervention package may include teaching the learner to request a break as a component. Although teaching a break could be useful, in some circumstances, it may be more appropriate to teach a learner to request help, or to tolerate demands for longer periods of time. In other words, simple replacement may not be adequate for effective intervention. More research is warranted determine the circumstances when simple replacement is warranted or when another procedures (e.g., fading, teaching a different communication response) may be indicated.

Another general area of research involves treatment options when extinction or punishment is not a viable option. These concerns arise when behavior cannot be ignored (e.g., dangerous behavior) or cannot be followed through with (cannot physically guide a learner to complete a task, unable to physically follow through with a punishment procedure). If extinction is the procedure of choice, yet is contraindicated for clinical reasons (e.g., concerns regarding behavioral escalation or imitation by others in the environment),

viable alternatives must be identified. While several promising, alternate treatment paths have been suggested, more research is needed into the utility of various interventions, especially differential and noncontingent reinforcement procedures. Similarly, alternatives to punishment need to be more systematically explored, in terms of the differential impact of punitive vs. non-punitive consequences, particularly regarding the speed of behavioral response, and especially with dangerous behaviors.

Summary and Implications for the Future

As the literature regarding functional behavior assessment evolves and becomes more refined, efforts to make these procedures viable in clinical settings are of paramount importance. Functional assessment has been shown to be a robust and important technology for understanding and intervening with challenging behaviors. In theory, its importance has been widely accepted, and it has been incorporated into educational service provision. However, the quality and depth of FA procedures as they are implemented in school settings vary widely. Many practitioners rely on rating scales or interview methods, which can yield biased or incomplete information. Direct observational measures are far superior to rating scales or interview formats. While this can lead to the identification of patterns that lead to effective treatment planning, it must also be done with objectivity and specificity. Functional analysis is the only method of functional assessment that involves actual manipulation of antecedents and consequences. It is the most controlled method of functional assessment, and yields the clearest data. Although the literature indicates that functional analyses are the most accurate procedures they are not commonly used in applied settings. In addition, the traditional functional assessment procedures may not be viable with certain populations (typically developing populations, older learners). In many cases, less intrusive models of assessment may be required. However, relatively little empirical research has evaluated the objectivity, reliability, and validity of these less intrusive alternatives (informant methods, descriptive analysis). If the most sophisticated and accurate procedures are not viable, alternatives need to be identified and tested.

Effective treatments for challenging behavior are generally comprised of proactive/antecedent interventions, teaching learners to access reinforcers appropriately (e.g., FCT) and having a systematic response to challenging behavior (i.e., extinction, punishment). Although these treatments are well-established and have garnered considerable empirical support, extension of these procedures to other populations is an area in need of sound research.

There is currently a significant gap between what constitutes best practice in assessment and treatment of challenging behavior and what is commonly implemented in applied settings. To effectively bridge this gap, researchers and practitioners must work from two ends of a continuum to ensure best practice. From a research standpoint, procedures need to be refined or developed to increase the likelihood that empirically sound procedures are used in applied settings. There is a need for the development of more "user-friendly" assessment and treatment procedures and developing variations of the procedures that are applicable to a variety of clinical populations. From a practitioner standpoint, training becomes an important strategy for bridging this gap. Training must occur for two different populations. First, practitioners who are currently in the field must be trained. This training can be accomplished through continuing education and workshops. Perhaps even more importantly, teacher training programs must be changed at the university level. Currently, teachers are infrequently trained in the principles of applied behavior analysis and are often ill prepared for intervening with challenging behavior (Shriver & Watson, 1999). Teachers need to be better equipped to conduct functional assessments and develop interventions upon coming out of training programs. Until these procedures are implemented as part of the teaching training curricula, the gap between best practice and clinical practice will remain.

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